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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,745	10/23/2003	Wen-Kuo Lin	SISP0006USA	2744

27765 7590 01/10/2005

(NAIPC) NORTH AMERICA INTERNATIONAL PATENT OFFICE
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EXAMINER	
WOODS, ERIC V	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/605,745	LIN, WEN-KUO
	Examiner	Art Unit
	Eric V Woods	2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 23 October 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-16 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-16 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 23 October 2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities:

-Pg. 1, [0005], line 1, the terms "Fig.1 and "Fig.2" are used but spaces should be inserted such that they read "Fig. 1" and "Fig. 2";

-Pg. 1, [0005], line 2, the term "ofan" is used, where the correct term, with space inserted, would be "of an";

-Pg. 1, [0005], line 3 – the terms "Fig.2" and "diagramofa" are used, where the correct terms, with spaces inserted, would be "Fig. 2" and "diagram of a";

-Pg. 2, [0005], line 3, the term "isa" is used, where the correct terms would be "is a";

-Pg. 2, following Eq. 1 – there is half a page of white space. This is unacceptable and must be removed. Also, the term "Eq.1." is not correct, and must be replaced with "Eq. 1". Et cetera.

Appropriate correction is required.

The specification is replete with grammatical and spelling errors while 35 U.S.C. 112, first paragraph, requires the specification to be written in "full, clear, concise, and exact terms." The specification is replete with terms that are not clear, concise and exact. The specification should be revised carefully in order to comply with 35 U.S.C. 112, first paragraph. The above informalities are provided as a list of the kinds of errors that the specification is replete with and how they are to be corrected.

Further, the specification is replete with white space that must removed, e.g. page 2 after Eq. 1, pages 9-11, which are almost all entirely white space, as are pages 14-17. This white space must all be removed, as must the white space on page 18.

A substitute specification without the claims is required pursuant to 37 CFR 1.125(a) because the specification is replete with equations that have not been formatted correctly and large amounts of white space that make it difficult to understand what applicant's invention is and makes it difficult to comprehend the disclosure. .

A substitute specification must not contain new matter. The substitute specification must be submitted with markings showing all the changes relative to the immediate prior version of the specification of record. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. An accompanying clean version (without markings) and a statement that the substitute specification contains no new matter must also be supplied. Numbering the paragraphs of the specification of record is not considered a change that must be shown.

Claim Objections

Claims 2 and 11 are objected to because of the following informalities: the term "integernatural" is used, where the correct terms would be "integer natural". Appropriate correction is required.

Claim 1 is objected to because of the following informalities: the terms "comprising following steps" are used on line, where the correct, idiomatic English would be "comprising the following steps".

Claim 10 is objected to because of the following informalities: the terms "portion data" is used, where the correct, idiomatic English would be "portion of data".

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> **The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.**

Claims 2 and 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2 and 11 are rejected as failing to define the invention in the manner required by 35 U.S.C. 112, second paragraph, given that it is unclear whether applicant is claiming that N is an even integer that is natural number or that N may be an even integer OR a natural number, or some other combination thereof.

Claim 2 is also rejected because steps (a) and (c) are recited. However, that does not make sense, as step (c) in the above process merely recites "repeating steps (a) and (b)..." Therefore, it is unclear if the N-tap digital filter is being applied to both steps (a) and (b) or not. For purposes of examining this claim, examiner will take the claim to mean that both (a) and (b) are performed using said N-tap filter and that N could be a natural number or an even integer (where one is a subset of the other numerically anyway).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nacman et al (US PGPub 2003/0128896 A1)('Nacman') in view of Nishigaki et al (JP 2000148997A)('Nishigaki').

As to claim 1,

A method for scaling a digital picture to generate a scaled picture comprising following steps:

(a) Scaling a portion of the digital picture instead of the whole digital picture in a first direction; (Nacman [0006, 0013, 0014] clearly teaches the scaling of a digital image in one direction at a time; Nishigaki clearly teaches the division of an image into pieces and processing of each of the pieces – see "Problem to be Solved" section of abstract)

(b) Scaling part of the data produced in step (a) in a second direction; and (Nacman [0006, 0013, 0014] clearly establishes that scaling can be done one dimension at a time)

(c) Repeating steps (a) and (b) to form the scaled picture. (Nishigaki clearly processes images in parallel, which is equivalent to "repeating steps" to get the desired end result – serial or parallel processing that produces the same results is functionally equivalent).

Reference Nacman clearly teaches scaling an image in multiple directions, but performing the scaling in only one direction at a time as recited by applicant, but does not expressly teach processing only a portion of the digital image. Reference Nishigaki clearly teaches partitioning an image into multiple pieces and processing each piece.

The two references are clearly directed to the same problem solving area, e.g. the processing of images.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing of Nacman with the image partitioning of Nishigaki, as it is well known in the art that processing an image in parallel (e.g. splitting it into pieces and then processing each piece) is much faster than processing an image at once, (for example, the processing time for an image split into 4 pieces and processed in parallel is cut by three-quarters versus the time required to process the original image, all other factors being held equal) thusly applying the technique to the image processing of Nacman would result in faster image scaling. It would also be *prima facie* obvious to anyone of ordinary skill in the art that parallel processing would be faster and thus, if possible, to process an image in that manner.

As to claim 8,

The method of claim 1 wherein step (b) is performed by using all of the data produced in step (a).

This is an obvious variation of claim 1. It would be obvious to one of ordinary skill in the art to continue processing the portion of an image produced in step (a) and then to process the entirety of that portion in step (b) because the desired end result is a

correctly scaled image portion. Further, as mentioned in Nacman [0014-0017], the scaling is performed in one direction and then in another. It would be obvious to continue processing the whole data portion sequentially. Also, the system of Nishigaki processes data portions by sending them to multiple processors. Such scaling would occur one direction at a time per portion, but given that portions would be processed, it would logical to keep the entire data portion in one block for processing, as it is simply easier and more logical. Any other variant would be difficult to implement practically.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing of Nacman with the image partitioning of Nishigaki, as it is well known in the art that processing an image in parallel (e.g. splitting it into pieces and then processing each piece) is much faster than processing an image at once, (for example, the processing time for an image split into 4 pieces and processed in parallel is cut by three-quarters versus the time required to process the original image, all other factors being held equal) thusly applying the technique to the image processing of Nacman would result in faster image scaling. It would also be *prima facie* obvious to anyone of ordinary skill in the art that parallel processing would be faster and thus, if possible, to process an image in that manner.

Claims 2-4 are rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Nishigaki as applied to claim 1 above, and further in view of Van Asma et al (US 6,600,514 B1)('Asma').

As to claim 2,

The method of claim 1 where steps (a) and (c) are performed by using an N-tap filter where N is an even integer natural number.

References Nacman and Nishigaki are silent about the nature of the digital processing. However, it is a fundamental of the digital image processing art that the scaling of an image clearly requires filtering of some kind, be it as crude as dropping rows of pixels for reduction of an image or simply interpolating them for enlargement, and fundamentally digital image processing is performed using convolution and filtering operation (see any textbook on the subject).

Reference Asma clearly teaches the use of an N-tap digital filter to filter images, and further teaches in 1:25-60 the use of such filters for processing images one dimension at a time, and further that such filter is composed of any N>2, which clearly fulfills the requirement that N be a natural number, and N=4 would be a even integer natural number as recited by applicant in the above claim.

The references are clearly analogous art, as both are directed to digital image processing (e.g. Nacman and Asma).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Nacman and Nishigaki because the filters of Asma are clearly taught to be good for processing images one dimension at a time (1:25-60).

As to claim 3,

The method of claim 1 wherein the first direction is a horizontal direction, and the second direction is a vertical direction.

Reference Nacman clearly teaches processing images one direction at a time, with multiple directions (Nacman [0013), but never specifies horizontal and vertical directions. Reference Asma clearly teaches in 1:40-50 the use of one filter to process the image in a horizontal direction and then in a vertical direction. Clearly, the cited one-dimensional filters of Asma would filter each direction specified in Nacman under that implementation. As mentioned in the rejection to claim 2, the above references are analogous art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Nacman and Nishigaki because the filters of Asma are clearly taught to be good for processing images one dimension at a time (1:25-60).

As to claim 4,

The method of claim 1 wherein the first direction is a vertical direction, and the second direction is a horizontal direction.

See the rejection to claim 3. This claim merely reverses the order of the directions being processed and is an obvious variation, as this type of image processing system can process images in either order and still get the same result.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Nishigaki as applied to claim 1 above, and further in view of Nielsen (US 6,591,011 B1)('Nielsen').

As to claim 5,

The method of claim 1 further comprising step (d): initializing a buffer used for storing the data produced by step (a).

Reference Nacman clearly teaches the use of buffers for holding data processed during the scaling of data in one direction ([0012-0014]). Clearly, such buffers have to be initialized. Reference Nielsen clearly teaches the use of buffers to hold transient data during processing (5:17-38, where clearly both buffers and "work areas" in memory for putting data during processing exist). Clearly, the larger and more numerous buffer areas of Nielsen would allow for a designated memory area and buffers to hold the results immediately after the scaling performed in step (a).

As far as the initializing step – Nielsen teaches that his system has an initializing step (9:25-30). Also, Nielsen shows a value being initialized in 30:35-45. Clearly, all buffers are initialized during an initialization step, and would *prima facie* be initialized each time a new data set was written in (e.g. for temporary storage after performing the step (a) recited by applicant). Nielsen performs zooming in 6:1-10 in feature extraction units 11 and 12 in Fig. 1.

Further, reference Nielsen can divide the image into multiple parts for processing (8:18-32), which would clearly allow for each portion to be processed by the parallel processing capabilities of Nishigaki.

The references are analogous art – they are both from class 382. Further, they both relate to image processing (5:10-67 as evidence for example in the case of Nielsen) and both perform digital image scaling / zooming. It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the

image processing systems of Nacman and Nishigaki with the image processing and buffers of Nielsen to enhance the number of buffers and memory work areas available to the processors of Nacman and Nishigaki, and to allow specific memory areas for storing the recited image portions.

As to claim 6,

The method of claim 5 wherein step (d) comprises mirroring part of the digital picture scaled in step (a).

References Nacman and Nishigaki do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Given that this act of mirroring takes place after the initialization step, clearly the system of Nielsen performs the recited step. Please see rejection for claim 5 above for analogous art justifications and similar.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Nacman and Nishigaki with the image processing and mirroring of Nielsen to allow transposition and rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B).

As to claim 7,

The method of claim 1 further comprising before scaling a last portion of the digital picture in the second direction, mirroring part of the digital picture scaled in step (a).

References Nacman and Nishigaki do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Clearly the system of Nielsen performs the recited step. Please see rejection for claim 5 above for analogous art justifications and similar.

Further, it would have been obvious to modify the apparatus of Nacman to perform the recited mirroring step in Nielsen so that it could process the image portions recited in Nielsen and Nishigaki (see rejection to claim 5 for the explication of the Nielsen reference providing splitting images into portions for processing). Also, image mirroring is extremely well known in the art and it is a fundamental technique of image processing along with translation and rotation.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Nacman and Nishigaki with the image processing and mirroring of Nielsen to allow transposition and rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B) and since both systems perform digital zoom functionality (Nielsen performs zooming in 6:1-10 in feature extraction units 11 and 12 in Fig. 1).

Claim 9 is rejected under 35 U.S.C. 103(a) as unpatentable over Nacman in view of Nishigaki as applied to claim 1 above, and further in view of Iga (US PGPub 2004/0021790 A1)('Iga').

As to claim 9,

The method of claim 1 further comprising removing part of the digital picture before performing steps (a) and (b) where a scaling factor is 2^k wherein k is a natural number.

References Nacman and Nishigaki do not explicitly teach the removal of part of the digital picture before scaling. Reference Nacman does not ever explicitly state what the scaling factor used is. Reference Iga clearly teaches the uses of noise removal means. The noise removal technique takes an original image 4A and removes the artifacts created by noise and produces the cleaner image 4B with the artifact 414 removed. Clearly, such a noise removal method would be useful for processing an image before scaling it in order to avoid introducing noise or artifacts into the scaled images.

As for the scaling factor limitation, clearly the values could be any reasonable number. For example, standard zoom factors available on imaging programs and cameras are 200% or a factor of 2, which is 2^1 and clearly meets the recited limitation of 2^k, since 1 is a natural number. [For examples of this, see for example Ishikawa et al (US 6,339,424 B1) – 7:35-50, et cetera.]

Further, the scaling factor is not specified to be the scaling factor used in steps (a) and (b), as this scale factor is introduced as 'a scale factor'.

Clearly, reference Iga is directed to the same problem solving area (e.g. image processing), as are Nacman and Nishigaki. Further, the elimination of noise is well known in the art as desirable, particularly in the pre-processing stages of image preparation. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the systems of Nacman and

Nishigaki with the image processing and noise reduction techniques of Ida to remove artifacts from the image before it was broken into portions and processed.

Claims 10 and 16 are rejected under 35 U.S.C. 103(a) as unpatentable over Masaki (US PGPub 2003/0218774 A1)('Masaki') in view of Nacman.

As to claim 10,

A method for scaling a digital picture comprising following steps:

(a) Inputting a source picture to a source memory; (Masaki, Fig. 1, clearly the input data going into the masking circuit is coming from a source memory; as taught in [0003], the with it being specified that for a typical device, the image is read in and then put into a buffer. In the case of a scanner, if this circuit were employed, firstly such image data would be obtained as taught in [0003] with the image data being read and then digitized and stored in a memory to be fed into the image masking circuit element 1 of Fig. 1. This is *prima facie* obvious that there must be a source memory; the inputting operation would be the digitization of the image capture from a scanner, as presented in [0003]) (Fig. 2, Nacman, video in (also image in) – see [0032]; which must *prima facie* require a memory)

(b) Providing a first buffer and a second buffer; (Clearly, Masaki Fig. 1 has a first buffer and second buffer – elements 2 and 4 respectively, with those labels.)(Scan line buffers, Nacman, Fig. 3 – each unit has a separate scan line buffer (elements 62 and 64))

(c) Determining scaling factors; (Masaki [0045] teaches a control panel for setting such values, and Masaki provides [0116-0117] examples with scaling factors implemented.)(Nacman [0036-0038])

(d) Generating initial data in the first buffer and second buffer; (This step is *prima facie* obvious – digital systems initialize buffers when they turn on – the circuits and systems of Masaki and Nacman would both obviously do the same. Also, given that applicant did not specify what the data was, it could be anything – when a digital system turns on, some kind of data is generated even if it is noise, as the storage elements in RAM must hold some (or none) initial amount of charge.)

(e) Transferring a portion data of the digital picture from the source memory to the first buffer; (Masaki clearly teaches this limitation – the data is input through the masking circuit into the first buffer [0004, 0046].)(Masaki further teaches that the data is split into portions for processing – see [0012] – "...which are obtained by dividing entered image data into a predetermined number of items of data..."])

(f) Using a filter to scale the data in the first buffer in a first direction and storing the scaled data in the second buffer; (Masaki has a filter element, as shown in Fig. 1 – element 3, that performs various steps. The data is taken from the first buffer and then placed in the second buffer [0004].)(Nacman clearly has elements – 22 and 24 in Fig. 1 – the interpolator and pixel window averaging section – that uses filtering. Performing an averaging operation on digital data *prima facie* requires a filter, as does interpolation. This particular operation – the filtering – is inherent to Nacman, to those particular components cited above. Clearly, in the Fig. 3 embodiment of Nacman, the data would be sent to the scan line buffers during processing in either element 22 or element 24.)

(g) Using the filter to scale the data in the second buffer in a second direction and storing the scaled data in a destination memory; and (Masaki – the MAG section 5 in

Fig. 1 clearly performs scaling and takes the data from the second buffer and sends it to the third buffer (element 7), which clearly constitutes a "destination memory".)

(h) Outputting a scaled picture from the destination memory. (Masaki clearly shows output from the third buffer in Fig. 1 – there is a labeled output, and in [0004] Masaki teaches that there is an interface circuit for reading data out to a device connected through the interface, which clearly meets this limitation. Clearly, the data in the third buffer is the scaled picture, as it is the result of the scaling operations performed by the MAG section.)(Nacman teaches video out, Figs. 2 and 3).

Reference Masaki teaches all of the above limitations except scaling the image in one direction at a time, which reference Nacman clearly teaches. The references are analogous art – they both are directed at image scaling and processing. Firstly, all digital image processing – e.g. where the system performs scaling of any kind – the operation being performed is inherently filtering. The definition of filter (American Heritage College Dictionary) recites "Any of various ... electronic ... devices that reject signals ... while allowing others to pass" or "A program that blocks access to data that meet a particular criterion." Ergo, any operation that removes certain data (e.g. downscaling) must inherently perform filtering, and any operation that adds data by merely replicating existing data must also be performing filter (e.g. enlargement / interpolation). Therefore, the "MAG" element 5 of Masaki Fig. 1 is clearly performing filtering.

Further, it would be obvious to modify the FIL element of Masaki to hold the device of Nacman (the scaling sub-portion) in addition to the recited edge smoothing

operations, such that each of the two units scaled in one direction only. In such a way, the system of Masaki could then implement perfectly the recited limitations of the above claim – that "the filter" would then scale it in one direction, send it to the buffer, and then scale the resultant image in the other direction as recited. Further, the system of Masaki processes images by portions as recited anyway. Finally, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the inventions of Masaki and Nacman, as the system of Nacman provides additional functionality (e.g. edge smoothing and noise removal) that would make the system of Nacman work better by incorporating those preprocessing steps such that noise was removed and edges were smoothed before the image was actually processed.

As to claim 16,

The method of claim 10 further wherein step (e) comprises removing part of the digital picture for downscaling.

Reference Masaki teaches this limitation in [0113-0118] where it is disclosed that unnecessary lines (e.g. lines not necessary for scaling) are removed - and Masaki further teaches that the determination is made line by line, so unneeded data is discarded before it enters the filtering unit in the first place. Therefore, it would be obvious that such filtering would in fact take place in the equivalent of step (e), and it would have been obvious to one of ordinary skill in the art to so modify the Masaki reference, because it would greatly speed image processing if unneeded lines were simply dropped before they ever entered the filtering apparatus and thusly processing

speed would be much increased. Since only the primary reference is utilized, no separate combination or motivation is required and that of the parent claim is hereby incorporated by reference if necessary.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as unpatentable over Masaki in view of Nacman as applied to claim 10 above, and further in view of Asma.

As to claim 11,

The method of claim 10 where steps (a) and (c) are performed by using an N-tap filter where N is an even integer natural number.

References Nacman and Masaki are silent about the nature of the digital processing per se, but Masaki does clearly perform filtering and the scaling operations are inherently filtering. However, it is a fundamental of the digital image processing art that the scaling of an image clearly requires filtering of some kind, be it as crude as dropping rows of pixels for reduction of an image or simply interpolating them for enlargement, and fundamentally digital image processing is performed using convolution and filtering operation (see any textbook on the subject).

Reference Asma clearly teaches the use of an N-tap digital filter to filter images, and further teaches in 1:25-60 the use of such filters for processing images one dimension at a time, and further that such filter is composed of any N>2, which clearly fulfills the requirement that N be a natural number, and N=4 would be a even integer natural number as recited by applicant in the above claim.

The references are clearly analogous art, as all are directed to digital image processing (e.g. Nacman, Masaki, and Asma).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Masaki and Nacman because the filters of Asma are clearly taught to be good for processing images one dimension at a time (Asma 1:25-60).

As to claim 12,

The method of claim 10 wherein the first direction is a horizontal direction, and the second direction is a vertical direction.

Reference Nacman clearly teaches processing images one direction at a time, with multiple directions (Nacman [0013]), but never specifies horizontal and vertical directions. Reference Asma clearly teaches in 1:40-50 the use of one filter to process the image in a horizontal direction and then in a vertical direction. Clearly, the cited one-dimensional filters of Asma would filter each direction specified in Nacman under that implementation. As discussed in the rejection to claim 11, the above references are analogous art.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the N-tap filter of Asma with the image processing of Masaki and Nacman because the filters of Asma are clearly taught to be good for processing images one dimension at a time (1:25-60).

As to claim 13,

The method of claim 10 wherein the first direction is a vertical direction, and the second direction is a horizontal direction.

See the rejection to claim 12. This claim merely reverses the order of the directions being processed and is an obvious variation, as this type of image processing system can process images in either order and still get the same result.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as unpatentable over Masaki in view of Nacman as applied to claim 10 above, and further in view of Nielsen.

As to claim 14,

The method of claim 10 wherein step (d) comprises mirroring part of the digital picture scaled in step (a).

References Masaki and Nacman do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Clearly the system of Nielsen performs the recited step. Please see rejection for claim 5 above for analogous art justifications and similar; examiner merely notes that all three are directed to image processing. Further, reference Nielsen can divide the image into multiple parts for processing (8:18-32), which would clearly match up with Masaki's division of an image into portions for processing. (Masaki further teaches that the data is split into portions for processing – see [0012] – "...which are obtained by dividing entered image data into a predetermined number of items of data...")

The references are analogous art – they are both from class 382. Further, they both relate to image processing (5:10-67 as evidence for example in the case of Nielsen) and both perform digital image scaling / zooming.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Masaki and Nacman with the image processing and mirroring of Nielsen to allow transposition and rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B).

As to claim 15,

The method of claim 10 further comprising before scaling a last portion of the digital picture in the second direction, mirroring part of the digital picture scaled in step (f).

References Nacman and Masaki do not explicitly teach this limitation. Reference Nielsen clearly teaches this limitation – e.g. the mirroring of a digital image (Figs. 16, 17A-17B; 3:54-65; 12:23-44, 12:52-67, 13:1-45). Clearly the system of Nielsen performs the recited step. Please see rejection for claim 5 above for analogous art justifications and similar.

Further, it would have been obvious to modify the apparatus of Nacman to perform the recited mirroring step in Nielsen so that it could process the image portions recited in Nielsen and Nishigaki (see rejection to claim 5 for the explication of the Nielsen reference providing splitting images into portions for processing). Also, image mirroring is extremely well known in the art and it is a fundamental technique of image processing along with translation and rotation.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the image processing systems of Nacman and Nishigaki with the image processing and mirroring of Nielsen to allow transposition and

rotation of images for further processing, as Nielsen teaches (see Figs. 16 and 17A-17B) and since all systems perform digital zoom functionality (Nielsen performs zooming in 6:1-10 in feature extraction units 11 and 12 in Fig. 1, and Masaki performs it as specified in the rejections for claim 10 and claim 14 above).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric V Woods whose telephone number is 703-305-0263. The examiner can normally be reached on M-F 7:30-5:00 alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi can be reached on 703-305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Eric Woods

January 6, 2005

JEFFERY BRIER
PRIMARY EXAMINER